

### Meaning of Percents

Percent means per hundred or parts of one hundred. For example, 15 percent means fifteen parts out of a hundred or  $\frac{15}{100}$ , and 15 percent can be written 15%.

Examples Express each of the following as a percent

- 1) 2 hundredths = \_\_\_\_\_ % (2%)
- 2) 56.7 hundredths = \_\_\_\_\_ % (56.7%)
- 3) .67 = 67 hundredths = \_\_\_\_\_ % (67%)
- 4)  $\frac{3}{4}$  hundredths = \_\_\_\_\_ % ( $\frac{3}{4}$ %)

Exercise I Express each of the following as a percent

1. 7 hundredths \_\_\_\_\_
6. 72.5 hundredths \_\_\_\_\_
2. 40 hundredths \_\_\_\_\_
7.  $65\frac{1}{4}$  hundredths \_\_\_\_\_
3. 300 hundredths \_\_\_\_\_
8. 97 out of 100 \_\_\_\_\_
4.  $\frac{1}{2}$  hundredths \_\_\_\_\_
9. 1 out of 100 \_\_\_\_\_
5. 68 hundredths \_\_\_\_\_
10. 20 out of 100 \_\_\_\_\_








## Changing percents to decimals

- 1) 35% means 35 one hundredths, but .35 also means 35 one hundredths; so 35% must equal .35
- 2)  $63\% = \frac{63}{100} = .63$

RULE: To change a percent to a decimal 1) change fractions to decimals if necessary 2) drop the percent sign % and 3) move the point two places to the left (add zeroes as necessary) or 1) drop the % sign then 2) change the fractions to decimals 3) divide the percent by 100

### Some Examples

Change the following percents to decimals

<u>Problem</u>	<u>How to do it</u>	<u>Answer</u>
a) 35% =	$35.\% =$ 	.35
b) $47\frac{1}{2}\%$	$47.5\% =$ 	.475
c) $6\frac{1}{2}\%$	<div data-bbox="332 987 454 1081" style="border: 1px solid black; padding: 2px; display: inline-block;">add zeroes</div> $06.5\% =$ 	.065
d) .3% =	$00.3\% =$ 	.003
e) $\frac{1}{4}\%$	$00.25\% =$ 	.0025
f) $\frac{2}{3}\%$	$00.667\% =$ 	.0067
g) 350% =	$350.\% =$ 	3.50

Exercise II Change the following percents to decimals

1) 30% \_\_\_\_\_

11) 42.6% \_\_\_\_\_

2) 14% \_\_\_\_\_

12) 700% \_\_\_\_\_

3) 25% \_\_\_\_\_

13)  $\frac{7}{8}\%$  \_\_\_\_\_

4) 95% \_\_\_\_\_

14) 1% \_\_\_\_\_

5) 7% \_\_\_\_\_

15) 18% \_\_\_\_\_

6) 100% \_\_\_\_\_

16) 53% \_\_\_\_\_

7) 75% \_\_\_\_\_

17) 110% \_\_\_\_\_

8) 41% \_\_\_\_\_

18)  $2\frac{1}{2}\%$  \_\_\_\_\_

9) 5% \_\_\_\_\_

19) 8.3% \_\_\_\_\_

10) .2% \_\_\_\_\_





20)  $\frac{3}{4}\%$  \_\_\_\_\_

## Changing Decimals into Percents

**RULE:** To change a decimal into a percent 1) move the decimal point two places to the right then 2) add the percent sign % or 1) multiply the decimal by 100 then 2) add the % sign.

Why does this work? Percent means hundredths; therefore multiplying the number by 100 moves the point two places to the right

### Examples

Problem	How to do it	Answer
a) $.85 =$	$.85 =$ 	85%
b) $.05 =$	$.05 =$ 	5%
c) $.085 =$	$.085 =$ 	8.5%
d) $.5 =$	<div data-bbox="451 877 571 976" style="border: 1px solid black; padding: 2px; display: inline-block;">add zero</div> $.50 =$ 	50%

Exercise III Change the following from decimals to percents

- |          |       |          |       |
|----------|-------|----------|-------|
| 1) .10   | _____ | 11) 4.37 | _____ |
| 2) .15   | _____ | 12) .003 | _____ |
| 3) .12   | _____ | 13) .07  | _____ |
| 4) .05   | _____ | 14) .19  | _____ |
| 5) .5    | _____ | 15) .065 | _____ |
| 6) .125  | _____ | 16) .32  | _____ |
| 7) .09   | _____ | 17) .75  | _____ |
| 8) .67   | _____ | 18) .84  | _____ |
| 9) 1.00  | _____ | 19) .04  | _____ |
| 10) .625 | _____ | 20) .59  | _____ |

## Changing percents to fractions

Rule: 1) Write the number over 100 and drop the percent sign

2) Reduce the resulting fraction, if necessary

Examples: Change these percents to fractions

Problem	How to do it	Answer
1) 60% =	$\frac{60}{100} = \frac{6}{10} =$	$\frac{3}{5}$
2) 225% =	$\frac{225}{100} =$	$\frac{9}{4}$ or $2\frac{1}{4}$
3) $12\frac{1}{2}\%$ =	$12\frac{1}{2} = \frac{25}{2}$ $\frac{25}{2} \times \frac{2}{2} = \frac{25}{1}$ $\frac{25}{100} = \frac{25}{100(2)} = \frac{25}{200} =$	$\frac{1}{8}$
4) $66\frac{2}{3}\%$ =	$66\frac{2}{3} = \frac{200}{3}$ $\frac{200}{3} \times \frac{3}{3} = \frac{200}{1}$ $\frac{200}{100} = \frac{200(3)}{100(3)} = \frac{200}{300} =$	$\frac{2}{3}$
5) $16\frac{1}{4}\%$ =	$16\frac{1}{4} = \frac{65}{4}$ $\frac{65}{4} \times \frac{4}{4} = \frac{65}{1}$ $\frac{65}{100} = \frac{65}{100(4)} = \frac{65}{400} =$	$\frac{13}{80}$
6) 150% =	$\frac{150}{100} =$	$\frac{3}{2}$ or $1\frac{1}{2}$

Clears  
fraction

Exercise IV Change the following from percents to fractions

1) 70% \_\_\_\_\_

11)  $87\frac{1}{2}\%$  \_\_\_\_\_

2) 25% \_\_\_\_\_

12) 24% \_\_\_\_\_

3)  $33\frac{1}{3}\%$  \_\_\_\_\_

13) 150% \_\_\_\_\_

4) 10% \_\_\_\_\_

14) 5% \_\_\_\_\_

5) 75% \_\_\_\_\_

15) 40% \_\_\_\_\_

6) 106% \_\_\_\_\_

16)  $62\frac{1}{2}\%$  \_\_\_\_\_

7) 65% \_\_\_\_\_

17) 36% \_\_\_\_\_

8)  $16\frac{2}{3}\%$  \_\_\_\_\_

18) 20% \_\_\_\_\_

9) 120% \_\_\_\_\_

19) 18% \_\_\_\_\_

10) 225% \_\_\_\_\_

20)  $12\frac{1}{2}\%$  \_\_\_\_\_

Change the following from fractions to percents

Ex. 1  $\frac{1}{2} = \underline{\hspace{2cm}}\%$       Solution:  $2 \overline{) \begin{array}{r} .50 \\ 1\ 0 \\ \hline 0 \end{array}}$  to find a decimal equivalent; answer :  $.50 = 50\%$

Ex. 2  $\frac{3}{5} = \underline{\hspace{2cm}}\%$       Solution:  $5 \overline{) \begin{array}{r} .60 \\ 3\ 0 \\ \hline 0 \end{array}}$  to find a decimal equivalent; answer :  $.60 = 60\%$

Ex.3

$3\frac{4}{5} = \underline{\hspace{2cm}}\%$      $3\frac{4}{5} = \frac{19}{5}$       Solution :  $5 \overline{) \begin{array}{r} 3.80 \\ 19.00 \\ \hline 15 \\ 40 \\ \hline 40 \\ \hline 0 \end{array}}$  to find a decimal equivalent; answer :  $3.80 = 380\%$



Exercise V: Changing fractions to percents

1)  $\frac{1}{2}$

7)  $\frac{2}{3}$

13)  $\frac{1}{16}$

2)  $\frac{4}{5}$

8)  $1\frac{1}{6}$

14)  $\frac{1}{12}$

3)  $1\frac{7}{8}$

9)  $\frac{3}{10}$

15)  $\frac{1}{4}$

4)  $1\frac{7}{8}$

10)  $\frac{1}{3}$

16)  $\frac{3}{4}$

5)  $\frac{2}{5}$

11)  $\frac{7}{8}$

17)  $\frac{5}{8}$

6)  $\frac{5}{6}$

12)  $5\frac{4}{5}$

18)  $2\frac{2}{3}$

## Percents

Percent means per hundred or for each hundred.

20% is twenty percent or 20 per hundred or  $\frac{20}{100}$ .

Hundredths are expressed in two-place decimals. To change percent to decimals: move the decimal point two places to the left and drop the % sign.

Example:

20% = .20	48.2% = .482
6% = .06	103.5% = 1.035
112% = 1.12	.0643% = .000643

Is this statement true? 20 is 50% of 40

There are 3 basic types of percent problems. Since there are 3 quantities in the statement 20 is 50% of 40, each type of problem relates to finding one of those quantities.

1) \_\_\_\_\_ is 50% of 40. How do we get 20 for an answer?

2) 20 is \_\_\_\_\_% of 40. How do we get 50% as an answer?

3) 20 is 50% of \_\_\_\_\_. How do we get 40 as an answer?

All problems of type #1 are worked the same way. Naturally, all of type #2 are worked the same way. This holds for type #3 as well. If you figure out these examples then you can apply them to all percentage problems.

Exercise VI: Find the percent of a number

1) 10% of 180

6) 8% of 1540

11) 4% of 8462

2) 60% of 160

7) 1% of 85

12) 3% of 180

3) 14% of 500

8)  $37\frac{1}{2}\%$  of 48

13) 5% of 1540

4)  $12\frac{1}{2}\%$  of 16

9) 15% of 300

14) 7% of 928

5) 2% of 18

10) 92% of 600

15) 24% OF 52

Exercise VII. Finding what percent one number is of another number

- |                        |                         |                       |
|------------------------|-------------------------|-----------------------|
| 1) 25 is ____% of 40   | 7) What % of 110 is 22? | 13) 9 is ____% of 54? |
| 2) 150 is ____% of 600 | 8) What % of 80 is 56?  | 14) 2 is ____% of 5?  |
| 3) 12 is ____% of 144  | 9) What % of 10 is 7?   | 15) 8 is ____% of 40  |
| 4) 36 is ____% of 45   | 10) What % of 90 is 81? | 16) 8 is ____% of 80  |
| 5) 2 is ____% of 4     | 11) What % of 50 is 15? | 17) 9 is ____% of 100 |
| 6) 6 is ____% of 24    | 12) 6 is what % of 3?   | 18) 45 is ____% of 45 |

Exercise VIII. Finding a number when a percent of it is known

1) 15% of what number is 18?      7)  $91 = 70\%$  of \_\_\_\_?

13) 28% of what number is 28?

2) 15 is 1% of \_\_\_\_?

8) 4 is  $16\frac{2}{3}\%$  of what number?

14) 100% of what number is 70?

3)  $43\%$  of \_\_\_\_ = 43

9) 12 is 24% of 48

15) 75% of what number is 108?

4) 45% of what number is 90?

10) 40 is 45% of what number?

16)  $62\frac{1}{2}\%$  of \_\_\_\_ = 200

5) 9 is 15% of what number?

11) 15% of what number is 45?

17) 18 is 60% of what number?

6)  $33\frac{1}{3}\%$  of number is 78?

12)  $\frac{3}{4}\%$  of \_\_\_\_ is 27

18) 20 is 20% of what number?

## Exercise IX. Mixed problems in percent

1) 1% of 62 is \_\_\_\_

11) 12 is \_\_\_\_% of 36

21) 20 % of what number is 3?

2) 4% of \_\_\_\_=26

12) 80 is 80% of \_\_\_\_

22) 16% of 240 is \_\_\_\_

3) 127% of 743 is \_\_\_\_

13) 39 is \_\_\_\_% of 52

23) 10% of 15.40 is \_\_\_\_

4) What % of 80 is 56?

14) 6 is \_\_\_\_% of 8

24) 8 is \_\_\_\_% of 6

5) 17 is 85% of what number?

15) 1% of 15.40 is \_\_\_\_

25) 60 is 45% of what number?

6) 9 is \_\_\_\_% of 10

16) 18 is 1% of \_\_\_\_

26) .3% of 160 is \_\_\_\_

7) 63% of 75 is \_\_\_\_

17) 35% of what number is 70?

27) 25% of what number is 108?

8) 15% of what number is 24?

18) 6 is 24% of what number?

28) 3 is \_\_\_\_% of 9

9) What percent of 3 is 2?

19) 6 is \_\_\_\_% of 60?

29) 18% of 4.7 is \_\_\_\_

10) 64 is \_\_\_\_% of 64?

20) 21% of 43 is \_\_\_\_

30) 55 is what percent of 110?

Answer Key

Exercise I	4. 5%	19. $\frac{9}{50}$	15. 12.48	16. 320
1. 7%	5. 50%	20. $\frac{1}{8}$	Exercise VII	17. 30
2. 40%	6. 12.5%	Exercise V	1. 62.5%	19. 100
3. 300%	7. 9	1. 50%	2. 25%	Exercise IX
4. 0.5% or $\frac{1}{2}$ %	8. 67%	2. 80%	3. 8.33%	1. 0.62
5. 68%	9. 100%	3. 187.5%	4. 80%	2. 650
6. 7.25%	10. 62.5%	4. 325%	5. 50%	3. 943.61
7. 65 %	11. 437%	5. 40%	6. 25%	4. 70%
8. 97%	12. 0.3%	6. $83\frac{1}{3}$ %	7. 20%	5. 20
9. 1%	13. 7%	7. $66\frac{2}{3}$ %	8. 70%	6. 90
10. 20%	14. 19%	8. $116\frac{2}{3}$ %	9. 70%	7. 47.25
Exercise II	15. 6.5% or $6\frac{1}{2}$ %	9. 30%	10. 90%	8. 160
1. 0.30	16. 32%	10. $33\frac{1}{3}$ %	11. 30%	9. $66\frac{2}{3}$ %
2. 0.14	17. 0.5%	11. 87.5%	12. 200%	10. 100%
3. 0.25	18. 84%	12. 580%	13. $16\frac{2}{3}$ %	11. $33\frac{1}{3}$ %
4. 0.95	19. 4%	13. $6\frac{1}{4}$ %	14. 40%	12. 100
5. 0.07	20. 59%	14. $8\frac{1}{3}$ %	15. 20%	13. 75%
6. 1.00	Exercise IV	15. 25%	16. 10%	14. 75%
7. 0.75	1. $\frac{7}{10}$	16. 75%	17. 9%	15. 0.154
8. 0.41	2. $\frac{1}{4}$	17. $62\frac{1}{2}$ %	18. 100%	16. 1800
9. 005	3. $\frac{1}{3}$	18. $266\frac{2}{3}$ %	Exercise VIII	17. 200
10. 0.002	4. $\frac{1}{10}$	Exercise VI	1. 120	18. 25
11. .426	5. $\frac{3}{4}$	1. 18	2. 1500	19. 10%
12. 7.00	6. $1\frac{3}{50}$	2. 96	3. 100	20. 9.03
13. 0.00875	7. $1\frac{3}{20}$	3. 70	4. 200	21. 15
14. 0.001	8. $\frac{1}{6}$	4. 2	5. 60	22. 38.4
15. 0.18	9. $1\frac{1}{5}$	5. .36	6. 234	23. 1.54
16. 0.53	10. $2\frac{1}{4}$	6. 123.2	7. 130	24. $133\frac{1}{3}$ %
17. 1.1	11. $\frac{7}{8}$	7. .85	8. 24	25. $133\frac{1}{3}$
18. 0.025	12. $\frac{6}{25}$	8. 18	9. 50	26. 0.48
19. 0.083	13. $1\frac{1}{2}$	9. 45	10. 88.88	27. 432
20. 0.0075	14. $\frac{1}{20}$	10. 552	11. 300	28. $33\frac{1}{3}$
Exercise III	15. $\frac{2}{5}$	11. 338.48	12. 3600	29. .846
1. 10%	16. $\frac{5}{8}$	12. 5.4	13. 100	30. 50%
2. 15%	17. $\frac{9}{25}$	13. 77	14. 70	
3. 12%	18. $\frac{1}{5}$	14. 64.96	15. 144	